

REMARKS

Claims 1-16 are pending in this application. Attached hereto is a complete listing of all claims in the application, with their current status listed parenthetically. By this Response, claims 17-19 have been added. These new claims are supported in the specification on page 5, lines 4-6.

Rejection Under 35 U.S.C. § 103

In paragraphs 1 and 2 of the Office Action, claims 1-16 stand rejected as unpatentable under 35 U.S.C. § 103(a) over U.S. Patent 5,687,169 ("Fullerton"), in view of U.S. Patent 6,097,707 ("Hodzic"), and further in view of U.S. Patent 6,347,084 ("Hulyalkar"). Applicant respectfully traverses this rejection.

A. The Law of Obviousness

In order to establish a *prima facie* case of obviousness, three basic criteria must be met:

"First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined), must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on the applicant's disclosure." M.P.E.P. § 2142.

As explained above, the Office Action makes a Section 103 rejection by combining three references. Because a modification to the prior art is required to support this Section 103 rejection, an appropriate motivation to modify must be set forth in order to establish a *prima facie* case of obviousness. *See, In re Fritch*, 972 F.2d 1266 (Fed. Cir. 1992).

On page three of the Office Action, the Examiner presents his motivation to modify: "[I]t would have been obvious to one of ordinary skill in the art to modify the teachings of Fullerton

to include the teaching of Hodzin [sic] in order to provide a reservation scheme for data traffic and a random access technique for control and signaling of traffic." Applicant submits that the proposed combination of Fullerton with Hodzic (and Hulyalkar) fail to follow the guidelines established by caselaw and the M.P.E.P.

In the Office Action, the Examiner begins his rejection by stating, in part:

"Referring to claims 1, 9, and 14, Fullerton discloses in figure 9 and respective portions of the specification of an ultrawide-band communication system. Fullerton further discloses in column 4, lines 1-55, column 9, lines 45 to column 10, lines 20 and in claim 1 and 4 of **full duplex transmission (in TDMA)** between at least two impulse radio transceivers . . ." (emphasis added)

Applicant respectfully disagrees with this interpretation of the teachings of Fullerton. Column 4, lines 1-55 of Fullerton contain a portion of a Table of Contents, and the text of the Overview section of the Table of Contents. In the Overview, Fullerton describes the characteristics of impulse radio technology (aka ultra-wideband):

"Impulse radios generally have: short duration pulses; center frequencies typically between 50 MHz and 10 gigahertz (GHz); ultrawide bandwidths of 100+% of the center frequency; multi-mile ranges with sub-milliwatt average power levels, even with low gain antennas; . . ." (col. 9, lines 27-31)

In short, in column 9, Fullerton describes the basic characteristics of ultra-wideband communication technology. The concepts of ultra-wideband technology were also presented by Applicant in the July 15, 2003, Response to Office Action.

In column 9, lines 45 to column 10, lines 20, Fullerton begins section III: Full Duplex for Impulse Radio Communications Systems. In this portion of the specification, Fullerton describes communication between a first transceiver (A) 902 and a second transceiver (B) 908 (col. 9, lines 46-55). Then, Fullerton describes "a pulse interleaving technique" that avoids "contention

"zones" where pulses from both transceivers would "pass exactly on top of each other", thus causing interference (col . 10, lines 4-19):

"The easiest way to resolve these contention zones 1206 is to permit the first transceiver to have a choice of say, 10 ns or 100 ns of delay before transmitting after receiving a pulse. This removes the interference at point 1208 for example, by pushing (position in time) pulse 1210 up to point 1212 so that the self-interference is avoided." (col. 10, lines 32-37, with reference to FIG. 12)

Thus, Fullerton teaches transmission of ultra-wideband pulses between two transceivers where the pulses are interleaved so as to avoid interference. **This is not TDMA.** TDMA (time division multiple access) is described in Applicant's specification:

"The MAC layer protocol of the present invention **divides data transmission time into discrete data "frames" which are structured and configured as TDMA frame 22.** Frames are further divided into sections. In the preferred embodiment, the TDMA frame 22 comprises a Start-Of-Frame section 24, a command section 26, and a data slot section 28. The data slot section 28 is further subdivided into a plurality of data slots 30a through 30n" (page 21, lines 5-10). (emphasis added)

Thus, a TDMA frame may comprise hundreds of slots that may contain an ultra-wideband pulse. The master and slave devices claimed in Applicant's independent claims 1, 9 and 14 **communicate by sending complete TDMA frames:**

"In general, the MAC layer of the present invention provides the master device 12 with the functions and routines for carrying out the operation of managing each TDMA frame 22 which is communicated in the network system 10 as described below" (page 20, lines 20-24).

On example of "as described below" includes:

"At reference number 100, the master device 12 periodically transmits an ALOHA broadcast **in the command section 26 of the TDMA frame 22** to invite protocol messages from "offline," "online," and "engaged" slave devices" (page 32, lines 5-7). (emphasis added)

Thus, communication by use of TDMA frames, as claimed by Applicant in claims 1, 9 and 14 is completely different than communication by discrete interleaved pulses, as taught by Fullerton.

Moreover, Fullerton teaches away from use of TDMA in ultra-wideband communication:

"Full duplex operation has traditionally been accomplished by either frequency domain or a time domain multiple access (FDMA or TDMA) . . . Because of the ultrawide-band characteristics of impulse radio, it is difficult to modify impulse radio systems to use conventional duplex schemes" (col. 1, lines 19-42).

Thus, Fullerton does not teach communication by TDMA, and in fact, teaches away from TDMA communication.

As mentioned above, in order to establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, and there must be a reasonable expectation of success. These requirements will be discussed below:

I. No motivation to combine references

As discussed above, Fullerton teaches ultra-wideband, or impulse radio communication, which uses discrete electromagnetic pulses that may occupy bandwidths spanning hundreds of megahertz.

In contrast, both Hodzic and Hulyalkar teach conventional communication through specific, assigned radio frequency channels. That is, both Hodzic and Hulyalkar employ

conventional carrier wave technology, which emits a continuous waveform at a specific, narrow frequency.

Specifically, Hodzic teaches a "single channel wireless digital communication network" with a "cellular topology" (Abstract). One object of Hodzic is "to provide a wireless radio frequency communications network which can utilize the existing worldwide cellular infrastructure" (col. 1, lines 55-58). As is well known, the existing cellular infrastructure in the United States operates in the 800 to 900 MHz frequency band.

Similarly, Hulyalkar teaches a method for synchronizing timestamps in a network, such as a wireless ATM network (Abstract). Hulyalkar discloses the problem of collisions of data packets sent by multiple transmitters using the same communications channel (col. 1, lines 11-14). The communications channels taught in Hulyalkar are IEEE 802.11 or IEEE 1394 protocols (col. 2, lines 66-67, and col. 3, lines 1-3). IEEE 802.11 is a protocol for wireless LANs that operates in the 2.4 GHz band, and IEEE 1394 is a protocol for high-speed serial buses.

In summary, Fullerton teaches ultra-wideband technology, and Hodzic and Hulyalkar teach conventional carrier wave technology. These are completely different communication technologies, and thus there is no motivation to combine these references.

Furthermore, as discussed above, Fullerton teaches away from using TDMA in ultra-wideband communications. However, in paragraph 2 of the Office Action, the Examiner has cited Hodzic as teaching TDMA and combines it with Fullerton. This is in spite of the teaching in Fullerton that TDMA and ultra-wideband are incompatible. According to M.P.E.P. § 2145, "it is improper to combine references where the references teach away from their combination."

II. No reasonable expectation of success.

The second prong of a *prima facie* case of obviousness requires a reasonable expectation of success. However, according to M.P.E.P. § 2142.01 "if the proposed modification or

combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious."

The Examiner proposes to combine Hodzic and Hulyalkar with Fullerton. As discussed above, both Hodzic and Hulyalkar employ conventional carrier wave technology that emits a continuous waveform at a specific, narrow frequency. In contrast, Fullerton teaches ultra-wideband, or impulse radio technology that emits discrete electromagnetic pulses that span hundreds of megahertz of frequency.

Clearly, a fundamental change to Fullerton's principle of operation is required for the Examiner's proposed combination to operate, and thus there is no reasonable expectation of success.

In view of the above discussion, Applicant respectfully submits that the Section 103 rejection of claims 1, 9 and 14 has been traversed. Because claims 2-8, 10-13 and 15-16 depend from either claim 1, 9 or 14, it is respectfully submitted that the rejection of claims 2-8, 10-13 and 15-16 have been traversed by virtue of their dependency from either claim 1, 9 or 14. M.P.E.P. § 2143.03.

Change of Attorney Address

Accompanying this Response to Office Action is PTO form SB/122, Change of Correspondence Address. Please change the correspondence address to:

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Conclusion

Applicant believes that this Response has addressed all items in the Office Action and now places the application in condition for allowance. Accordingly, favorable reconsideration and allowance of claims 1-19 at an early date is solicited. No fee is believed due with this response. Should any issues remain unresolved, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

2.11.04
Date


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